Abstract Submitted
for the DPP01 Meeting of
The American Physical Society

Sorting Category: 5.6.2 (Experimental/Observational)

Dependence of Achievable β_N on Discharge Shape and Edge Safety Factor in DIII-D Steady-State Scenario Discharges[1] J.R. FERRON, T.C. LUCE, P.A. POLITZER, General Atomics, R. JAYAKUMAR, LLNL, M.R. WADE, ORNL — One line of research in the DIII-D program is development of a high bootstrap-current-fraction (f_{BS}) discharge which can be sustained in steady-state with the addition of electron cyclotron current drive (ECCD). High f_{BS} requires high normalized beta (β_N) and effective ECCD requires low electron density (n_e). Target values of β_N are above the limit that would be predicted by theory for ideal, $n = 1$ kink modes without a conducting wall so β_N is often limited by $n = 1$ resistive wall modes. When discharge shape changes (lower triangularity and elongation) were made to optimize cryopumping to reduce n_e the achievable β_N values were reduced by about 10% to ≈3.4. An increase in q_{95} of about 15% to near the original value, made by increasing the toroidal field, resulted in consistently higher values of $\beta_N > 4$. A similar increase in β_N could not be made by adjusting the shape within the constraints of the cryopumping geometry. Comparison with predictions of ideal MHD theory are presented.

[1]Work supported by US DOE under Contract Nos. DE-AC03-99ER54463, W-7405-ENG-48, and DE-AC05-00OR22725.

J.R. Ferron
ferron@fusion.gat.com
General Atomics

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: Poster 12, Stability, MHD, Current Drive, Advanced Tokamak

Date submitted: July 19, 2001 Electronic form version 1.4